

Claims

We claim:

- 5 1. An antenna grounding assembly for a hand-held device, said
 grounding assembly comprising:
 an antenna having an antenna shaft connected between a grounding
 block and a protective sheath;
 an antenna tube affixed within said hand-held device and holding said
10 antenna, said antenna tube having an upper end through which said
 antenna shaft is extended or retracted, and an inner end opposite said
 upper end; and
 a grounding clip installed into said inner end of said antenna tube, said
 grounding clip having a base and at least one contact pin extending axially
15 along said antenna tube for resilient contact with said grounding block.
2. The antenna grounding assembly of claim 1, wherein said antenna
 tube further has a tapered lip at said inner end.
- 20 3. The antenna grounding assembly of claim 2, wherein said antenna
 tube further includes a groove between said inner end and said upper
 end.
4. The antenna grounding assembly of claim 3, wherein said base of said
25 grounding clip is adapted to fit securely between said groove and said
 tapered lip of said antenna tube.
5. The antenna grounding assembly of claim 4, wherein said base of said
 grounding clip is resiliently deformable in a radial direction for
30 installation of said grounding clip over said tapered lip.

6. The antenna grounding assembly of claim 5, wherein said grounding clip is held in place by said tapered lip and said groove.

5 7. The antenna grounding assembly of claim 6, wherein said base of said grounding clip includes angled tabs for removal of said grounding clip from said antenna tube.

8. The antenna grounding assembly of claim 1 having two contact pins.

10 9. The antenna grounding assembly of claim 1, wherein said at least one contact pin is dog legged in shape.

10. The antenna grounding assembly of claim 9, wherein said contact pin tapers from an apex to a tab at an end of said contact pin.

15 11. The antenna grounding assembly of claim 10, wherein said tab is adapted to bear against an inner surface of said antenna tube.

20 12. The antenna grounding assembly of claim 11, wherein said contact pin between said apex and said tab is resiliently flexible.

13. The antenna grounding assembly of claim 12, wherein said grounding clip is gold plated.

25 14. The antenna grounding assembly of claim 1, wherein said contact pin has a forked end.

15. The antenna grounding assembly of claim 1, wherein said contact pin is curved

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16. The antenna grounding assembly of claim 1, wherein said antenna tube is mounted to a printed circuit board using surface mount technology clips.
- 5 17. The antenna grounding assembly of claim 16, wherein said antenna tube further includes a flange at its upper end and said printed circuit board includes a groove to accept said flange, thereby restricting movement in the axial direction of said antenna tube.
- 10 18. The antenna grounding assembly of claim 17, wherein movement of said antenna tube is further restricted by plastic components in said hand-held device.
- 15 19. The antenna grounding assembly of claim 1, further comprising a mount on said handheld device, said mount located above said upper end and having a hole through which said antenna shaft passes.
- 20 20. The antenna grounding assembly of claim 19, further comprising a tube connected to said mount and extending into said antenna tube, said tube providing waterproofing for said antenna grounding assembly.
- 25 21. The antenna grounding assembly of claim 20, further comprising a cap adapted to fit snugly over said inner end of said antenna tube, said cap providing a seal for said antenna tube.
- 30 22. An antenna grounding assembly for a hand-held device, said grounding assembly comprising:
an antenna having an antenna shaft connected between a grounding block and a protective sheath;

an antenna tube affixed within said hand-held device and holding said antenna, said antenna tube having a flanged upper end through which said antenna shaft is extended or retracted, and an inner end opposite said upper end;

5 a grounding clip installed into said inner end of said antenna tube; and
a printed circuit board having a groove therein, said antenna tube being mounted to said printed circuit board using surface mount technology clips and said flanged end fitting into said groove to restrict axial movement of said antenna tube.

10 23. The antenna grounding assembly of claim 22, wherein said grounding clip includes a base and at least one contact pin extending axially along said antenna tube for resilient contact with said grounding block.

15 24. The antenna grounding assembly of claim 23, wherein said antenna tube further has a tapered lip at said inner end.

20 25. The antenna grounding assembly of claim 24, wherein said antenna tube further includes a groove between said inner end and said upper end.

26. The antenna grounding assembly of claim 25, wherein said base of said grounding clip is adapted to fit securely between said groove and said tapered lip of said antenna tube.

25 27. The antenna grounding assembly of claim 26, wherein said base of said grounding clip is resiliently deformable in a radial direction for installation of said grounding clip over said tapered lip.

30 28. The antenna grounding assembly of claim 27, wherein said grounding clip is held in place by said tapered lip and said groove.

29. The antenna grounding assembly of claim 28, wherein said base of grounding clip includes angled tabs for removal of said grounding clip from said antenna tube.

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30. The antenna grounding assembly of claim 23 having two contact pins.

31. The antenna grounding assembly of claim 23, wherein said at least one contact pin is dog legged in shape.

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32. The antenna grounding assembly of claim 31, wherein said contact pin tapers from an apex to a tab at an end of said contact pin.

33. The antenna grounding assembly of claim 32, wherein said tab is adapted to bear against an inner surface of said antenna tube.

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34. The antenna grounding assembly of claim 33, wherein said contact pin between said apex and said tab is resiliently flexible.

35. The antenna grounding assembly of claim 34, wherein said grounding clip is gold plated.

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36. The antenna grounding assembly of claim 23, wherein said contact pin has a forked end.

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37. The antenna grounding assembly of claim 23, wherein said contact pin is curved.

38. The antenna grounding assembly of claim 22, further comprising a mount on said handheld device, said mount located above said flanged upper end and having a hole through which said antenna shaft passes.

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39. The antenna grounding assembly of claim 38, further comprising a tube connected to said mount and extending into said antenna tube, said tube providing waterproofing for said antenna grounding assembly.

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40. The antenna grounding assembly of claim 39, further comprising a cap adapted to fit snugly over said inner end of said antenna tube, said cap providing a seal for said antenna tube.

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